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| 09/776,675      | 02/06/2001  | Nobuo Ishii          | 08038.0048          | 2524             |

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| EXAMINER |
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CROWELL, ANNA M

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| ART UNIT | PAPER NUMBER |
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1763

DATE MAILED: 03/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/776,675

Applicant(s)

ISHII, NOBUO

Examiner

Michelle Crowell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 December 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-8 and 10-20 is/are rejected.
- 7) ☒ Claim(s) 2 and 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-8, 10-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (Japanese Patent Publication 11-121196) in view of Suzuki et al. (EP 0880164) and Imahashi et al. (U.S. 5,432,472).

Note. U.S. Patent 6,076,484 is used as the English translation for Japanese Patent Publication 11-121196. The numbers in parentheses refer to the U.S. equivalent.

Referring to Figures 4(3) and 5(9), column (8), lines (36-65) and column (10), line (47) – column (11), line (5)), Matsumoto discloses a microwave plasma process apparatus designed to improve process speed and distribute plasma uniformly. The microwave apparatus comprises a reactor 1 (process vessel), antenna 11 for introducing microwaves into the reactor 1, microwave introducing window which is sealed to sealing plate 4 (microwave transmittable top wall), microwave oscillator 20 (microwave source), waveguide 21 (connecting waveguide) for connecting the waveguide antenna part 12 (ring-shaped antenna waveguide) to the microwave

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oscillator 20, and plural slits 15 (plurality of slots) disposed in the wall of waveguide antenna part 12.

As seen in Figure 4 and 9, the proximal end portion (side aperture) of the waveguide antenna part 12 is coupled with waveguide 21 and forms the curve portion 12a (substantially radial direction). In addition, the terminal end portion of the waveguide antenna part 12 is closed with a conductive movable plate 17 (conductor). The moveable plate 17 reflects the microwaves, thereby producing a standing wave.

Matsumoto fails to teach a plurality of substantially ring-shaped antenna waveguides and a microwave absorber.

Referring to Figures 19a-c, column 27, lines 30-56, Suzuki teaches that it is known for a microwave applicator 3 (antenna) to have a plurality of annular waveguides 43 and 44 (ring shaped antenna waveguides having a substantially rectangular radial cross-section) (col. 27, lines 43-47). Furthermore, microwaves are introduced to each annular waveguide 43 and 44 from the respective microwave introducing ports 54 and 55 (plurality of apertures). Also, each annular waveguide 43 and 44 contains a plurality of slots 3b and 3b'. A plurality of ring-shaped antenna waveguides provide uniform microwave radiation intensity distribution. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Matsumoto with a plurality of ring-shaped antenna waveguides with apertures as taught by Suzuki. This would allow microwaves to radiate over a large area and for uniform microwave radiation intensity distribution.

Referring to Figures 1 and 4, and column 4, lines 37-42, Imahashi teaches a microwave absorbing body 41 (microwave absorber) for absorbing reflected waves generated in the

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waveguide 4 (connecting waveguide). The microwave absorbing body 41 is located in the terminal end of the waveguide 4. In addition, the microwave absorbing body 41 prevents the return of the reflected waves to the magnetron. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the connecting waveguide and antenna waveguides of Matsumoto with a microwave absorber as taught by Imahashi. This would prevent reflected waves from returning to the magnetron.

### ***Allowable Subject Matter***

3. Claims 2 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Response to Arguments***

4. Applicant's arguments filed July 30, 2002 have been fully considered but they are not persuasive.

**Applicant has argued that the apparatus resulting from the alleged combination of Matsumoto et al. and Suzuki et al. does not disclose a proximal end portion and a terminal end portion since the annular waveguides of Suzuki et al. do not have proximal and terminal end portions.**

Matsumoto in view of Suzuki satisfies this requirement. Matsumoto discloses an annular waveguide with a proximal and terminal end portion. The teachings of Suzuki simply show that when a plurality of annular waveguides is used, an uniform, large-area plasma is generated.

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Thus, large area wafers can be processed. The combination does not require replacing the antenna waveguides of Matsumoto with Suzuki, nor does it require using both Matsumoto and Suzuki antenna waveguides simultaneously, but it teaches providing a plurality of Matsumoto's antenna waveguides. Therefore, one of ordinary skill in the art recognizes that a plurality of ring-shaped antenna waveguides (like Matsumoto) with a terminal end and a proximal end would still provide an uniform, large-area plasma to process large-area wafers.

The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

**Applicant has argued that the connecting waveguide (5) of Suzuki et al. does not disclose a terminal end.**

The teachings of Suzuki were used to illustrate that it well known to use a plurality of annular waveguides. Matsumoto discloses a terminal end. Applicant has made arguments against the references individually, however one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

**Applicant has argued that the alleged combination is considered to be based on an improper hindsight reasoning that requires unreasonable, imaginative constructions to arrive at the claimed invention.**

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In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

**Applicant has argued that it is unclear as to why one of ordinary skill in the art would have been motivated to modify the apparatus of Matsumoto et al., since Matsumoto already achieves uniform microwave introduction into the chamber**

In this case, Matsumoto teaches an antenna waveguide with a proximal end portion, a terminal end portion, and a connecting waveguide connected to the proximal end portion of the antenna waveguide. Suzuki teaches using a plurality of ring-shaped antenna waveguides to provide uniform microwave radiation intensity distribution over a large area wafer. Therefore, the motivation is to have a plurality of antenna waveguides with each antenna waveguide having a proximal end portion, a terminal end portion, and a connecting waveguide connected to the proximal end portion of the antenna waveguides is to **provide uniform microwave radiation intensity distribution over a large area wafer.**

**Applicant has argued that there is no motivation to combine the teachings of Matsumoto with the Suzuki since they address different problem s lving areas.**

The requirements of a *prima facie* case of obviousness do not require that the problem solving area of each reference be the same. There needs to be a motivation to combine the references which has been stated before and the references should be from the same field of endeavor or same problem solving area. Both references have the same field of endeavor, which is, microwave plasma processing systems. The motivation to combine the references is to provide an uniform microwave radiation intensity distribution over a larger wafer area.

Applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

**Applicant has argued that the combination of cited references fail to teach or suggest the claimed invention, the combination does not show a reasonable expectation of success, because it is unclear as to how the plurality of annular waveguides of Suzuki could be incorporated into the device of connecting waveguide of Matsumoto.**

The teachings of Suzuki demonstrate that when you have a plurality of annular waveguides, a plurality of corresponding microwave introducing ports (plurality of apertures) are necessary. This combination does not require that the microwave introducing ports be located on the upper surface of the antenna. Therefore, a plurality of Matsumoto's antenna waveguides would have corresponding microwave introducing ports located radially in the same plane of the antenna, which would result in a reasonable expectation of success.



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The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

### ***Conclusion***

**5. THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (703) 305-1956. The examiner can normally be reached on M-F (8:00 - 4:30).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC *RME*  
February 28, 2003

  
**SHRIVE P. BECK**  
**SUPERVISORY PATENT EXAMINER**  
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